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SERIAL NUMBER	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/327,113	10/21/94	RONZANI	P KPN9309ACA

EXAMINER	
~~WU, X~~	

ART UNIT	PAPER NUMBER
2609	7

26M2/1219

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DATE MAILED: 12/19/95

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

☐ This application has been examined ☒ Responsive to communication filed on 9/28/95 ☒ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), 0 days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☐ Notice of References Cited by Examiner, PTO-892.
2. ☐ Notice of Draftsman's Patent Drawing Review, PTO-948.
3. ☐ Notice of Art Cited by Applicant, PTO-1449.
4. ☐ Notice of Informal Patent Application, PTO-152.
5. ☐ Information on How to Effect Drawing Changes, PTO-1474.
6. ☐ _____.

Part II SUMMARY OF ACTION

1. ☒ Claims 1-20 are pending in the application.
   Of the above, claims _____ are withdrawn from consideration.
2. ☐ Claims _____ have been cancelled.
3. ☐ Claims _____ are allowed.
4. ☒ Claims 1-20 are rejected.
5. ☐ Claims _____ are objected to.
6. ☐ Claims _____ are subject to restriction or election requirement.
7. ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawings are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____. has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).
11. ☐ The proposed drawing correction, filed _____, has been ☐ approved; ☐ disapproved (see explanation).
12. ☐ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. _____; filed on _____.
13. ☐ Since this application apppears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in

1. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 C.F.R. § 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. § 102(f) or (g) prior art under 35 U.S.C. § 103.

2. Claims 1-20 are rejected under 35 U.S.C. § 103 as being unpatentable over Kamaya et al (U.S. Patent No. 5,106,179) in view of Berman (US PAT NO. 5,050,966).

As to claims 1 and 14, Kamaya discloses a head-mounted display apparatus comprising: a matrix liquid crystal display panel (14, Figs. 2-4) to generate an image; an optical system (15, 16) that receives the generated image and to extend the optical path of the generated image by reflection of the image within the optic system, the optical system transmitting a

displayable image; a viewing surface (7) to receive the displayable image from the optical system, the image on the viewing surface being viewable by a user; a display housing (2, Figs. 1-3) in which the matrix liquid crystal display panel, the optical system and the viewing surface are housed; and a support (5, 6, Fig. 1) that holds the display housing relative to the user's head. Kamaya does not specifically disclose the LCD display is an active matrix type LCD. However, the active matrix type LCD is well known in the art. It is desirable to use active matrix type LCD because it can provide a high quality and very sharp image to a user. Further, Kamaya does not disclose that the optical system directs the image onto a cholesteric liquid crystal element. However, such a cholesteric liquid crystal element in a optical system for a helmet display is well known in the art such as taught by Berman. As shown in Fig. 2A, Berman discloses a polarizer (30) to polarize the generated image in a first orientation to a second orientation, a partially-transmissive concave mirror (42) having a light transmissive first surface to transmit the generated image and a reflective surface to alter the polarization of light incident on the first surface and a cholesteric liquid crystal element (44) having a first polarization back toward the second surface of the mirror and to transmit light having a second polarization. The cholesteric liquid crystal element of Berman functions the same way as to applicants claimed invention. It would have been

obvious to one of ordinary skill in the art to have modified Kamaya the optical system with the features of the optical system of Berman, so that the viewer can view the image projected by LCD and the image incident from outside.

As to claim 2, It is well known in the art that the active matrix liquid crystal comprised transistors as a switch element for each display element and those transistors are bonded to an optically transmissive substrate with an adhesive layer.

As to claim 4, Kamaya discloses that the image is processed by reflection with the optical system (15, 16).

As to claims 3, 5-8 and 15-18 Kamaya does not specifically disclose the optic system comprising a polarizer, a partially-transmissive concave mirror and a cholesteric liquid crystal mirror and a cholesteric liquid crystal element. However, such elements in a optical system for a helmet display is well known in the art such as taught by Berman. As shown in Fig. 2A, Berman discloses a polarizer (30) to polarize the generated image in a first orientation to a second orientation, a partially-transmissive concave mirror (42) having a light transmissive first surface to transmit the generated image and a reflective surface to alter the polarization of light incident on the first surface and a cholesteric liquid crystal element (44) having a first polarization back toward the second surface of the mirror and to transmit light having a second polarization. It would have been obvious to one of ordinary skill in the art to have

modified Kamaya the optical system with the features of the optical system of Berman, so that the viewer can view the image projected by LCD and the image incident from outside.

As to claim 9, Berman discloses an optical combiner (30) which combines the projection image with a viewing image.

As to claim 10, Berman discloses that the viewing image is a direct view image.

As the claim 11, Berman discloses that the optical combiner is a partially transmissive mirror.

As to claims 12-13 and 19-20, Kamaya discloses that the display system is a binocular display system or a monocular display system.

3. Applicant's arguments filed September 28, 1995 have been fully considered but they are not deemed to be persuasive.

Applicant argues that Kamaya and Berman can not be combined because the Head-mounted display of Berman is a CRT display and not an active matrix liquid crystal display. This arguments is not persuasive because Berman is cited to teach that the optical system is used for the head-mounted display. The optical system of Berman is not necessary only for CRT projection but also for LCD projection because the optical system of Berman functions as a projector, it can project an image either from a CRT display or a LCD display.

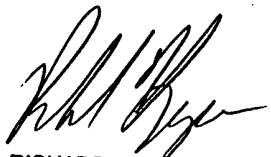
4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiao Wu whose telephone number is (703) 305-4721. The examiner can normally be reached on Monday to Friday from 8:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe, can be reached on (703) 305-4709. The fax phone number for this Group is (703) 305-9508.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700.



RICHARD HJERPE
SUPERVISORY PATENT EXAMINER
GROUP 2600

XW

December 14, 1995